

Ser. No. 10/699,262
Examiner Gregory E. Webb
Art Unit 1751

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CLAIMS

Amendments to the Claims:

This listing of claims will **replace all prior** versions, and listings, of claims in the application:

1. (Currently Amended) A method of cleaning comprising the steps of: selecting a wash liquor consisting essentially of: a non-aqueous working fluid and at least one washing adjuvant; bringing said working fluid in contact with the fabric in an automatic washing machine; ~~and~~ applying mechanical energy to provide relative movement within said fabric in the automatic washing machine;
wherein the non-aqueous working fluid is a substantially non-reactive, non-aqueous, non-oleophilic, apolar working fluid; and
the at least one washing adjuvant is selected from the group of: ~~builders, surfactants, enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, finishing aids, lime soap dispersants, composition malodor control agents, odor neutralizers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy metal ion sequestrants, anti-tarnishing agents, anti-microbial agents, anti-oxidants, linkers, anti-redeposition agents, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilizers, corrosion inhibitors, diamines or polyamines or alkoxylates, suds stabilizing polymers, process aids, fabric softening agents, optical brighteners, hydrotropes, suds or foam suppressors, suds or foam boosters, fabric softeners, antistatic agents, dye fixatives, dye abrasion inhibitors, anti-crooking agents, wrinkle reduction agents, wrinkle resistance agents, soil release polymers, soil repellency agents, sunscreen agents, anti-fade agents and mixtures thereof.~~

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2. (Original) The method of claim 1 wherein said non-reactive, non-aqueous, non-oleophilic, apolar working fluid under standard conditions is further characterized by: a KB value less than approximately 30; a surface tension less than approximately 35 dynes/cm²; and a solubility in water less than 10%.
3. (Previously Presented) The method of claim 1 in which substantially all materials that comprise the automatic washing machine in contact with said working fluid are selected from a group of non-spark generating materials.
4. (Previously Presented) The method of claim 1 in which the substantially all of the materials that comprise the automatic washing machine contacted by said working fluid are conductive polymers.
5. (Previously Presented) The method of claim 1 wherein said mechanical energy occurs in a chamber which confines said working fluid and fabric in the automatic washing machine.
6. (Previously Presented) The method of claim 28 including the step of introducing a water-in-working fluid emulsion to the chamber which confines the fabric and said working fluid.
7. (Previously Presented) The method of claim 32 wherein at least one dispensing chamber is provided and the at least one washing adjuvant is added to said chamber.
8. (Previously Presented) The method of claim 32 including a further step of introducing a water-in-working fluid emulsion into the adjuvant-dispensing chamber.
9. (Previously Presented) The method of claim 32 including a further step of introducing a water-in-working fluid emulsion to the fabric prior to bringing the working fluid in contact with the fabric.

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10. (Previously Presented) The method of claim 1 including a further step of detecting the level of said working fluid in contact with the fabric.
11. (Previously Presented) The method of claim 1 including a further step of sensing the initial moisture content of the fabric.
12. (Previously Presented) The method of claim 11 wherein the sensing step is carried out by sensing the humidity of the fabric to be cleaned.
13. (Previously Presented) The method of claim 11 wherein the sensing step is carried out by sensing the conductivity of the fabric.
14. (Previously Presented) The method of claim 11 wherein the sensing step is carried out by sensing the humidity of the air.
15. (Previously Presented) The method of claim 11 wherein the sensing step is carried out inside the chamber.
16. (Previously Presented) The method of claim 1 wherein the temperature inside the chamber is sensed and adjusted to ensure that the temperature does not exceed 30 °F below the flash point of said working fluid unless the concentration of said working fluid does not exceed its lower flammability limit.
17. (Currently Amended) The method of claim 1 wherein the washing adjuvant is selected from a group consisting of: ~~builders, comprises~~ surfactants, ~~enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, suds stabilizing polymers, fabric softening agents, optical brighteners, suds or foam suppressors, suds or foam boosters, fabric softeners, antistatic~~

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~~agents, dye fixatives, wrinkle reduction agents, wrinkle resistance agents, soil release polymers, soil repellency agents, sunscreen agents, anti fade agents and mixtures thereof.~~

18. (Original) The method of claim 17 wherein a preferred surfactant for the system will have a hydrophilic-lipophilic balance from approximately 3 to 14.
19. (Previously Presented) The method of claim 1, further comprising:
separating said working fluid from the fabric; cooling the working fluid for decreasing the dissolved soils in the working fluid; and filtering said working fluid to produce a permeate.
20. (Original) The method of claim 19 wherein said non-reactive, non-aqueous, non-oleophilic, apolar working fluid under standard conditions is further characterized by: a KB value less than approximately 30; a surface tension less than approximately 35 dynes/cm²; and a solubility in water less than 10%.
21. (Previously Presented) The method of claim 19 including a further step of filtering the permeate through a hydrophobic filter.
22. (Previously Presented) The method of claim 21 including a further step of filtering the permeate through a ceramic filter.
23. (Original) The method of claim 19 wherein vapors from said working fluid are treated by a high speed spinning disc which removes said working fluid and water vapor from the air stream.
24. (Original) The method of claim 23 including the step of cooling the vapor contacted by the spinning disc.

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25. (Original) The method of claim 19 wherein said working fluid may have impurities of not more than approximately 20%.

26. (Currently Amended) The method of claim 1, further comprising applying ultraviolet radiation to the fabric ~~19 wherein the washing adjuvant is selected from a group consisting of: builders, surfactants, enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, finishing aids, lime soap dispersants, composition malodor control agents, odor neutralizers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy metal ion sequestrants, anti-tarnishing agents, anti-microbial agents, anti-oxidants, linkers, anti-redeposition agents, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilizers, corrosion inhibitors, diamines or polyamines or alkoxylates, suds stabilizing polymers, solvents, process aids, fabric softening agents, optical brighteners, hydrotropes, water, suds or foam suppressors, suds or foam boosters, fabric softeners, antistatic agents, dye fixatives, dye abrasion inhibitors, anti-croaking agents, wrinkle reduction agents, wrinkle resistance agents, soil release polymers, soil repellency agents, sunscreen agents, anti-fade agents and mixtures thereof.~~

27. (Previously Presented) The method of claim 26 wherein the at least one wash adjuvant is a surfactant and the surfactant for the system has a hydrophilic-lipophilic balance from approximately 3 to 14.

28. (Currently Amended) A method of cleaning comprising the steps of:

contacting a fabric with a wash liquor in an automatic washing machine, the wash liquor consisting essentially of: a non-aqueous working fluid, a co-solvent water, and a washing adjuvant;

applying mechanical energy to provide relative movement within said fabric in the automatic washing machine;

wherein the non-aqueous working fluid is a substantially non-reactive, non-aqueous, non-oleophilic, apolar working fluid;

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wherein the co-solvent is water; and

wherein the washing adjuvant is selected from the group of: ~~builders, surfactants, enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pre-perfumes, finishing aids, lime soap dispersants, composition malodor control agents, odor neutralizers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy metal ion sequestrants, anti-tarnishing agents, anti-microbial agents, anti-oxidants, linkers, anti-redeposition agents, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilizers, corrosion inhibitors, diamines or polyamines or alkoxylates, suds stabilizing polymers, process aids, fabric softening agents, optical brighteners, hydrotropes, water, suds or foam suppressors, suds or foam boosters, fabric softeners, antistatic agents, dye fixatives, dye abrasion inhibitors, anti-croeking agents, wrinkle reduction agents, wrinkle resistance agents, soil release polymers, soil repellency agents, sunscreen agents, anti-fade agents and mixtures thereof.~~

29. (Previously Presented) The method of claim 28 wherein the non-reactive, non-aqueous, non-oleophilic, apolar working fluid under standard conditions is further characterized by: a KB value less than about 30; a surface tension less than about 35 dynes/cm²; and a solubility in water less than about 10%.

30. (Previously Presented) The method of claim 28 in which substantially all materials that comprise the automatic washing machine in contact with the working fluid are selected from a group of non-spark generating materials.

31. (Previously Presented) The method of claim 28, further comprising:
separating the working fluid from the fabric; cooling the working fluid for decreasing the dissolved soils in the working fluid; and filtering the working fluid to produce a permeate, wherein the working fluid has impurities of not more than about 20%.

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32. (Currently Amended) A method of cleaning comprising the steps of:

contacting a fabric with a wash liquor in an automatic washing machine, the wash liquor comprising: a working fluid, ~~a co-solvent~~, and a washing adjuvant;

applying mechanical energy to provide relative movement within said fabric in the automatic washing machine;

wherein the working fluid is a substantially non-reactive, non-aqueous, non-oleophilic, apolar working fluid;

wherein the wash liquor is substantially free of ~~a~~ an organic co-solvent; and

wherein the washing adjuvant is selected from the group of: ~~builders~~, surfactants, enzymes, ~~bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, finishing aids, lime soap dispersants, composition malodor control agents, odor neutralizers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy metal ion sequestrants, anti-tarnishing agents, anti-microbial agents, anti-oxidants, linkers, anti-redeposition agents, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilizers, corrosion inhibitors, diamines or polyamines or alkoxylates, suds stabilizing polymers, process aids, fabric softening agents, optical brighteners, hydrotropes, suds or foam suppressors, suds or foam boosters, fabric softeners, antistatic agents, dye fixatives, dye abrasion inhibitors, anti-crocking agents, wrinkle reduction agents, wrinkle resistance agents, soil release polymers, soil repellency agents, sunscreen agents, anti-fade agents and mixtures thereof.~~

33. (Previously Presented) The method of claim 32 wherein the non-reactive, non-aqueous, non-oleophilic, apolar working fluid under standard conditions is further characterized by: a KB value less than about 30; a surface tension less than about 35 dynes/cm²; and a solubility in water less than about 10%.

34. (Previously Presented) The method of claim 32 in which substantially all materials that comprise the automatic washing machine in contact with said working fluid are selected from a group of non-spark generating materials.

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35. (Previously Presented) A method of claim 32, further comprising:
separating the working fluid from the fabric; cooling the working fluid for decreasing the dissolved soils in the working fluid; and filtering the working fluid to produce a permeate, wherein the working fluid may have impurities of not more than about 20%.

36. (Currently Amended) A method of cleaning comprising the steps of:

contacting a fabric with a wash liquor in an automatic washing machine, the wash liquor comprising: ~~a non-reactive washing component and an adjuvant;~~

a non-aqueous, non-reactive, non-oleophilic, apolar working fluid;

water;

an adjuvant; and

applying mechanical energy to provide relative movement within the fabric in the automatic washing machine; and

~~wherein the non-reactive component consists essentially of: a substantially non-aqueous, non-reactive, non-oleophilic, apolar working fluid and at least one inorganic co-solvent.~~

37. (Currently Amended) The method of claim 36, wherein the washing adjuvant is selected from the group of: ~~builders, surfactants, enzymes, bleach activators, bleach catalysts, bleach boosters, bleaches, alkalinity sources, antibacterial agents, colorants, perfumes, pro-perfumes, finishing aids, lime soap dispersants, composition malodor control agents, odor neutralizers, polymeric dye transfer inhibiting agents, crystal growth inhibitors, photobleaches, heavy metal ion sequestrants, anti-tarnishing agents, anti-microbial agents, anti-oxidants, linkers, anti-redeposition agents, electrolytes, pH modifiers, thickeners, abrasives, divalent or trivalent ions, metal ion salts, enzyme stabilizers, corrosion inhibitors, diamines or polyamines or alkoxylates, suds stabilizing polymers, process aids, fabric softening agents, optical brighteners, hydrotropes, suds or foam suppressors, suds or foam boosters, fabric softeners, antistatic agents, dye fixatives, dye abrasion inhibitors, anti-croaking agents, wrinkle reduction agents, wrinkle resistance agents, soil release polymers, soil repellency agents, sunscreen agents, anti-fade agents and mixtures thereof.~~

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38. (Previously Presented) The method of claim 36 wherein the substantially non-reactive, non-aqueous, non-oleophilic, apolar working fluid under standard conditions is further characterized by: a KB value less than about 30; a surface tension less than about 35 dynes/cm²; and a solubility in water less than about 10%.

39. (Currently Amended) The method of claim 38 ~~in which substantially all materials that comprise the automatic washing machine in contact with the working fluid are selected from a group of non-spark generating materials~~ wherein the method further comprises applying ultraviolet radiation to the fabric.

40. (Previously Presented) The method of claim 36, further comprising:
separating said working fluid from the fabric; cooling the working fluid for decreasing the dissolved soils in the working fluid; and filtering said working fluid to produce a permeate, wherein the substantially non-aqueous, non-reactive, non-oleophilic, apolar working fluid has impurities of not more than about 20%.